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Efficacy of Mannheim Peritonitis Index in predicting mortality among patients with peritonitis: a cross-sectional study

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Abstract:
Introduction: Peritonitis is a life-threatening condition necessitating immediate medical attention, with early recognition and appropriate management crucial for improving outcomes. The Mannheim Peritonitis Index (MPI) serves as a widely used scoring system for predicting severity and mortality risk in peritonitis. However, its efficacy in predicting mortality warrants further investigation. This study aims to assess the effectiveness of MPI in predicting mortality among peritonitis patients.

Methodology: This cross-sectional study was conducted at a tertiary care hospital from January 2018 to June 2018. All patients diagnosed with peritonitis admitted during the study period were included, excluding those with incomplete medical records or missing data. Data, including demographic information, clinical features, laboratory investigations, and MPI scores, were collected from medical records. The primary outcome was mortality, with the secondary outcome being the correlation between MPI and mortality.

Results: A total of 100 patients were included, predominantly male (62%) with a mean age of 56 years. Perforation was the leading cause of peritonitis (80%). The overall mortality rate was 32%. Survivors had a mean MPI score of 22 (SD= 5.6), while non-survivors had a mean MPI score of 36 (SD= 4.8), with a significant difference between the groups ($p<0.001$). Comorbidities were significantly associated with mortality ($p= 0.015$), whereas age and sex showed no significant associations. A strong positive correlation was observed between MPI scores and mortality ($r= 0.812$, $p<0.001$).

Conclusion: The Mannheim Peritonitis Index effectively predicts mortality in peritonitis patients. Clinicians can utilize MPI for early mortality risk assessment and subsequent management planning, ultimately enhancing patient outcomes. Further validation studies are warranted to confirm these findings across diverse settings and populations.

Introduction:

Peritonitis is a life-threatening condition that requires immediate medical attention. Early recognition of the severity of the disease and appropriate management can improve patient outcomes.[1] The Mannheim Peritonitis Index (MPI) is a widely used scoring system for predicting the severity and mortality risk of peritonitis. However, its efficacy in predicting mortality in patients with peritonitis needs to be investigated. Peritonitis is a serious medical condition characterized by inflammation of the peritoneum, the membrane that lines the abdominal cavity and covers the abdominal organs.[2] It is usually caused by the spread of

infection from the gastrointestinal tract or other organs, such as the appendix or the gallbladder. Peritonitis can be life-threatening and requires prompt medical attention. Early recognition of the severity of the disease and appropriate management can significantly improve patient outcomes.[3]

The Mannheim Peritonitis Index (MPI) is a widely used scoring system for predicting the severity and mortality risk of peritonitis. It was developed in 1987 by the Surgical Infection Study Group (SISG) of the University of Mannheim in Germany. The MPI takes into account various clinical, laboratory, and radiological parameters, such as age, underlying diseases, vital signs, white blood cell count, and radiographic findings. The MPI score ranges from 0 to 47, with higher scores indicating a higher risk of mortality.[4]

Although the MPI has been used extensively in clinical practice and research, its efficacy in predicting mortality in patients with peritonitis needs to be investigated.[4] Therefore, this study aims to evaluate the efficacy of MPI in predicting mortality among patients with peritonitis. Understanding the effectiveness of MPI in predicting mortality can help clinicians make timely decisions regarding the management of patients with peritonitis, which can ultimately improve patient outcomes.

Aim:

This study aims to evaluate the efficacy of MPI in predicting mortality among patients with peritonitis.

Methodology:

Study Design: This is a cross-sectional study conducted in a tertiary care hospital in the period of January 2018 to June 2018.

Study Participants: The study included all patients with a diagnosis of peritonitis admitted to the hospital during the study period. Patients with incomplete medical records or missing data were excluded from the study.

Data Collection: Data was collected from medical records, including demographic information, clinical features, laboratory investigations, and MPI scores. Demographic information included age, sex, and underlying comorbidities. Clinical features included the cause of peritonitis, signs and symptoms, and physical examination findings. Laboratory investigations included complete blood count, serum electrolytes, and liver function tests. MPI scores were calculated based on the SISG criteria. The primary outcome was mortality, and the secondary outcome was the correlation between MPI and mortality.

Data Analysis: Data analysis was performed using statistical software SPSS version 23. Descriptive statistics were used to summarize the data. Categorical variables were expressed as frequencies and percentages, while continuous variables were expressed as means and standard deviations. The chi-square test was used to compare categorical variables, and the t-test was used to compare continuous variables between the groups. A p-value of less than 0.05

was considered statistically significant. The correlation between MPI and mortality was analyzed using Pearson's correlation coefficient.

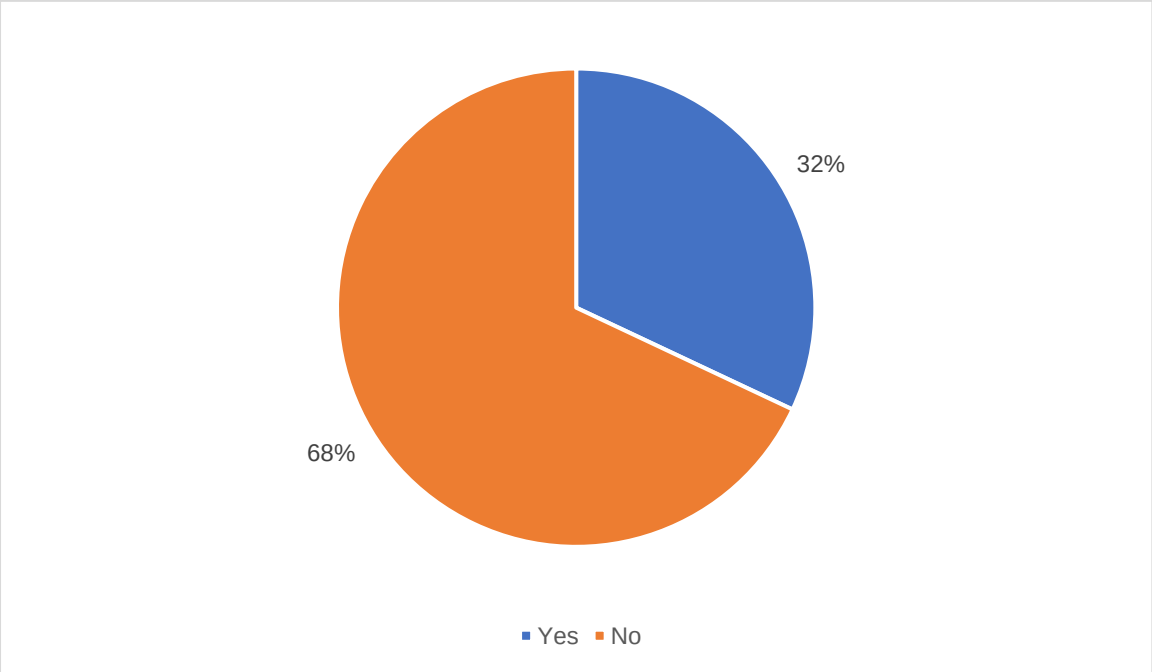
Results:

A total of 100 patients were included in the study, of which 62 (62%) were male and 38 (38%) were female. The mean age of the patients was 56 years. The most common cause of peritonitis was perforation (80%), followed by secondary peritonitis (20%).

Table 1: Baseline characteristics of the study participants

Parameter	**Total no of participants n=100**
Age in years (Mean (SD))	56 (14.6)
Gender Male Female	 62 38
Cause of peritonitis Perforation Secondary peritonitis	 80 20

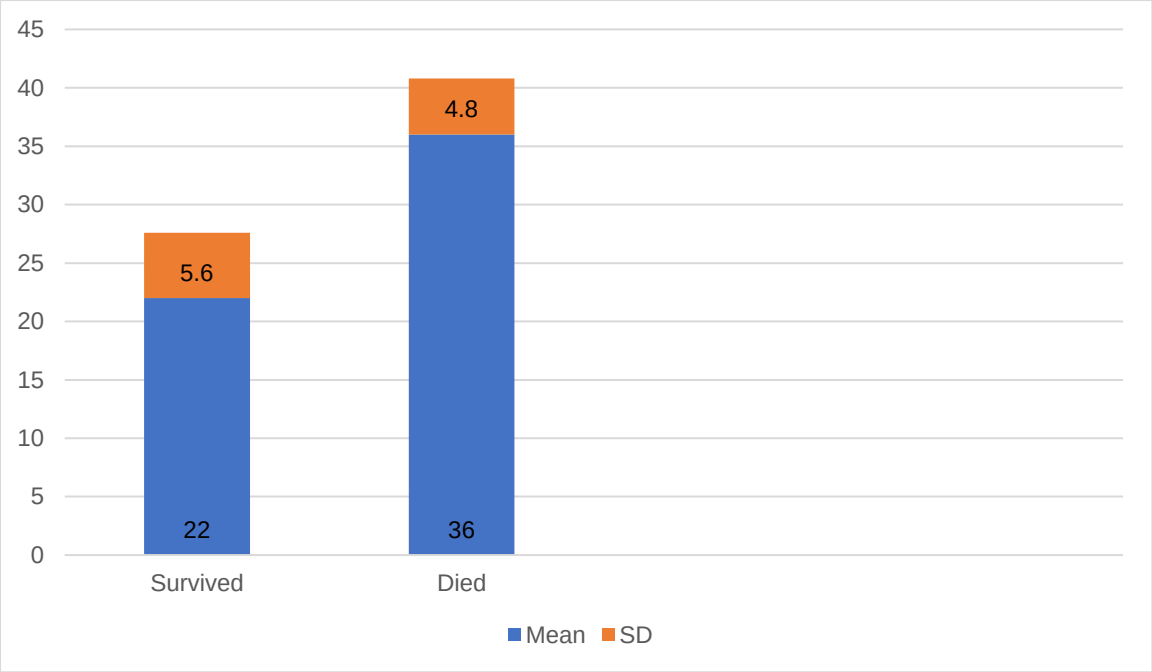
Figure 1: Mortality rate



The overall mortality rate was 32%.

The mean MPI score for patients who survived was 22 (SD= 5.6), while the mean MPI score for those who died was 36 (SD= 4.8). The difference in the mean MPI score between the two groups was statistically significant ($p<0.001$).

Figure 2: MPI score of the study participants



Among the demographic variables, age and sex were not significantly associated with mortality (p= 0.152 and p= 0.658, respectively). However, the presence of comorbidities was significantly associated with mortality (p= 0.015). Patients with underlying comorbidities had a higher mortality rate compared to those without comorbidities. The correlation analysis showed a strong positive correlation between MPI and mortality (r= 0.812, p<0.001). A higher MPI score was associated with an increased risk of mortality.

Discussion:

Peritonitis is a serious medical condition that can lead to significant morbidity and mortality if not managed appropriately. Early recognition of the severity of the disease and prompt management are essential for improving patient outcomes. The Mannheim Peritonitis Index (MPI) is a widely used scoring system for predicting the severity and mortality risk of peritonitis.[3] The present study aimed to evaluate the efficacy of MPI in predicting mortality among patients with peritonitis.

Our study included a total of 100 patients, with a slightly higher proportion of males (62%) compared to females (38%). The mean age of the patients was 56 years, reflecting a broad age range within the study population. Perforation emerged as the predominant cause of peritonitis, accounting for 80% of cases, while secondary peritonitis accounted for the remaining 20%. The overall mortality rate among the study participants was 32%, indicating a considerable

burden of mortality associated with peritonitis. We evaluated the Mortality Probability Index (MPI) scores among survivors and non-survivors, finding a notable difference between the two groups. Patients who survived had a significantly lower mean MPI score of 22 (SD= 5.6), whereas those who died had a higher mean MPI score of 36 (SD= 4.8). This discrepancy in MPI scores between survivors and non-survivors suggests that MPI could serve as a useful prognostic indicator for identifying patients at higher risk of mortality.

We explored the association between demographic variables and mortality outcomes. Surprisingly, age and sex did not exhibit significant associations with mortality in our study population. However, the presence of comorbidities emerged as a significant predictor of mortality, with patients having underlying comorbidities demonstrating a higher mortality rate compared to those without comorbidities. This highlights the importance of considering comorbidities in the assessment and management of peritonitis patients. Our correlation analysis revealed a strong positive correlation between MPI scores and mortality ($r= 0.812$, $p<0.001$). This suggests that as MPI scores increase, there is a corresponding increase in the risk of mortality among peritonitis patients. The robustness of this correlation underscores the potential utility of MPI as a predictive tool for identifying patients at heightened risk of adverse outcomes.

The results of the present study showed that MPI is an effective tool for predicting mortality in patients with peritonitis.[5] The study demonstrated a strong positive correlation between MPI scores and mortality, indicating that higher MPI scores are associated with an increased risk of mortality. This finding is consistent with previous studies that have reported the usefulness of MPI in predicting mortality in patients with peritonitis.[6,7]

The MPI score takes into account various clinical, laboratory, and radiological parameters that can help clinicians assess the severity of peritonitis and predict mortality risk.[8] The use of MPI can aid in the timely identification of high-risk patients who require intensive care or surgical intervention, which can ultimately improve patient outcomes.[9,10] In addition, the present study showed that the presence of comorbidities was significantly associated with mortality, indicating that patients with underlying comorbidities had a higher mortality rate compared to those without comorbidities.[11,12] The use of MPI in clinical practice can help clinicians make timely decisions regarding the management of patients with peritonitis.[13] For example, patients with high MPI scores may require aggressive management, including surgical intervention or admission to the intensive care unit. Conversely, patients with low MPI scores may be managed conservatively with antibiotics and supportive care.[14]

Despite the usefulness of MPI in predicting mortality, there are some limitations to its use. MPI is based on data collected at the time of admission, and changes in the patient's clinical condition over time may not be reflected in the score. In addition, the use of MPI may not be appropriate for all patients, particularly those with atypical presentations or comorbidities that may affect the accuracy of the score.[12,13]

The present study confirms the efficacy of MPI in predicting mortality among patients with peritonitis. The use of MPI can aid in the timely identification of high-risk patients who require intensive care or surgical intervention, which can ultimately improve patient outcomes. However, further studies are needed to validate the findings of this study and to evaluate the usefulness of MPI in different settings and populations.

Conclusion:

The Mannheim Peritonitis Index is an effective tool for predicting mortality in patients with peritonitis. The study suggests that higher MPI scores are associated with increased mortality risk. Clinicians can use MPI as an early prognostic tool to predict mortality risk in patients with peritonitis and plan their management accordingly.

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